

THE EXTENSION PATHOLOGIST

A NEWS LETTER FOR EXTENSION WORKERS INTERESTED IN PLANT DISEASE CONTROL

Serial Number 33

July 1938

PROFIT FROM POTATO SEED TREATMENT IN KANSAS

Results obtained from demonstration plots during the past 10 years prove that Irish-potato seed treatment is a practice which every commercial grower and home gardener should adopt.

Following are results secured in the Kaw Valley section of Kansas for the years 1936 and 1937, using acidulated corrosive sublimate treatment:

	Average yield bushels per acre	Average increase bushels per acre
	Untreated seed	Treated seed
1936	143.94	158.97
1937	146.94	162.93

In 1936, growers in the Kaw Valley received approximately \$1.20 per bushel for their potatoes at harvesttime. This would mean an increased return of \$18.04 per acre for seed treatment. To mix up one batch of seed-treating solution would cost about \$1.12, this being enough to treat 50 bushels of seed, or a cost of slightly over 2 cents per bushel. Usually growers plant from 14 to 16 bushels of seed per acre. This would mean a cost of 30 to 35 cents per acre for material used in seed treatment. In addition to the increase in bushels produced per acre, the potatoes harvested from treated seed generally contain a lower percentage of culls and are of better quality.

Irish-potato seed treatment in 1937 returned a profit of \$7.38 an acre, according to 14 demonstration plots established and harvested by county agents and cooperators. Potatoes sold at harvesttime in the neighborhood of 48 cents a bushel.

--J. O. Miller, extension plant pathologist, Kansas.

SEED-POTATO TREATMENT

As in past years, the county farm bureaus of several western New York counties offered a treating service to their members in 1937. In those regions where scab is troublesome, hot formaldehyde was used, and in other sections, hot corrosive sublimate. A summary of these services is given in the following table:

854-38

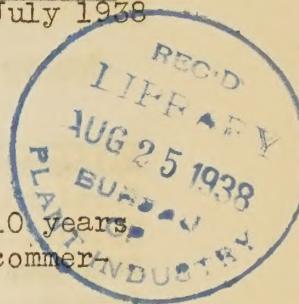


Table 1.--Treating services given for scab by county farm bureaus in several western New York counties

County	Hot material used	No. of farmers served	Number bushels treated	Average no. bu. treated per day	Average cost treatment, cents per bushel
Allegany...	Corrosive sublimate	59	6,000	1,000	5
Cortland...	Formaldehyde	6	739	--	4
Erie.....	do.	111	8,261	1,180	2
Genesee....	do.	80	18,410	1,315	5
Genesee....	Corrosive sublimate	35	8,725	1,745	5
Monroe.....	Formaldehyde	168	20,278	1,843	6
Onondaga...	do.	19	2,383	1,192	4
Onondaga...	Corrosive sublimate	4	604	--	4
Ontario....	Formaldehyde	41	3,337	--	5
Orleans....	Formaldehyde)	40	2,975	--	5
	Corrosive sublimate)		5,525	1,900	5
Wayne.....	Formaldehyde	117	7,744*	1,549	5
		680	84,981		

*Includes 200 bushels treated for one Cayuga County farmer

It can be seen, that 64,127 bushels were treated with hot formaldehyde and 20,854 bushels, or about one third as many, with hot corrosive sublimate. In addition to these, an undetermined number but at least as many more were treated by farmers at their farms. One or two of the largest growers used the hot-formaldehyde method and a great many used yellow oxide of mercury. Others used organic mercury or the older cold-formaldehyde or corrosive-sublimate methods.

Instruction in testing the strength of formaldehyde was given county agents or operators of treating tanks in four western New York counties at the time the treating started.

--M. F. Barrus, extension plant pathologist, Annual Report, 1937. New York.

COPPER OXYCHLORIDE FOR MELONS IN MASSACHUSETTS

In view of the well known susceptibility of all cucurbits to copper injury, and the fact that the rather recently introduced copper oxychloride, or basic copper chloride, has proved a promising substitute for bordeaux mixture on these crops in other States, a spray test was conducted this summer to compare this new fungicide with Bordeaux. The demonstration was arranged in cooperation with the county agent and with a commercial concern which furnished about 25 pounds of its brand, Cupro-K, of that material for the test.

Four applications of Cupro-K and Bordeaux 2-2-50 were made on adjacent plots of Bender Surprise between August 2 and September 1. One 150-gallon tank of spray was applied to each plot at each application with a power sprayer equipped with a wide boom. On August 25, it was plainly evident that the new spray was causing only a mere trace of leaf injury, while Bordeaux had caused the usual, noticeable marginal yellowing and brittleness of leaves. Furthermore, there appeared to be a larger number of large melons in the Cupro-K plot than in the Bordeaux area. The counts made subsequently verified this opinion.

The unseasonably warm weather of September 2-4 caused the oldest melons to mature rapidly, and the owner was forced to begin harvesting before official counts of melons could be made. He made three light pickings, in the Cupro-K plot but not in the Bordeaux plot, on September 4, 6, and 7. When we made field counts on September 8, in two 300-foot-row sections in each treatment, we found the following numbers and grades of melons. The (a) grade included the largest size melons that were practically ready for harvest; the (b) grade, the medium size ones, nearly ready for harvest; and the (c) grade, the smaller ones that perhaps would not reach maturity.

Table 2.—Result of spray test to compare new fungicide with bordeaux mixture

	Number of melons				
	Grade (a)	Grade (b)	Grade (c)	Total	
Cupro-K:	Grade (a)	Grade (b)	Grade (c)	Total	
	First row	15	54	46	115
	Second row	15	61	35	111
Bordeaux:	Total	30	115	81	226
	First row	7	54	56	117
	Second row	2	40	49	91
	Total	9	94	105	208

Hence, despite the three light pickings from the Cupro-K plot before the counts were made, that treatment yielded a larger number of marketable melons than the bordeaux plot. It has been observed in experimental sprayings in other States that bordeaux mixture is not only injurious to the foliage but to the set of fruit as well on both cucumbers and melons. In this test, the Cupro-K controlled anthracnose, *Macrosomium* leaf-blight, and downy mildew as well as did Bordeaux 2-2-50. There was the same amount of metallic copper applied in the two sprays.

--O. C. Boyd, extension plant pathologist, Annual Report, 1937. Massachusetts.

PROGRESS IN CONTROLLING DISEASE OF GREENHOUSE TOMATOES

The tomato-wilt disease has not completely disappeared from Indiana greenhouses, but it has become a minor problem. This is due to the use of wilt-resistant varieties and to steam disinfection of the soil.

The leaf-mold of tomatoes is now much less serious than formerly. It is interesting to note the increased number of men who continue to carry heat in their houses until late in June and ventilate at the same time. When asked why they are doing it, many of them reply that they found out about this practice from some other grower. This shows the spread of the information between growers, since this is the method of control that has been demonstrated during the past 2 years.

One gardener estimated that his loss from leaf-mold last year was about \$50 per house 25 by 130 feet. This year the same man is holding the disease in check by the heat and ventilation method of control. Another gardener gave up growing tomatoes for 1 year because of the serious losses from leaf-mold. He started the practice of carrying heat in the houses and ventilating at night. Last year and this year he has had excellent crops with almost no leaf-mold present.

Mosaic disease is much less prevalent than formerly. It is difficult to say just how much our recommendations relating to care in the use of tobacco while working with tomato plants has influenced this reduction in mosaic, but it is evident that they have had an influence. One grower at Elkhart has never taken seriously the relation of tobacco mosaic to tomato mosaic. They all use tobacco in every form, and every year they have 100 percent mosaic in the plants. On the other hand, growers have completely eradicated mosaic and winter blight by care in the use of tobacco. Last year an epidemic of winter blight occurred in several Indianapolis greenhouses. I had warned the growers of the danger because of the prevalence of mosaic. This year there is very little winter blight in these greenhouses.

Problems that cause much concern among vegetable gardeners are: How to improve the set of tomatoes in the first two clusters; how to reduce split, cracked, and catface fruit; and how to prevent blossom end rot.

These problems are all closely associated with their soil management and use of fertilizers and manure. Years of constant criticism of their methods and explanation of the nutrition of plants is causing a gradual change. More and more vegetable gardeners are using commercial fertilizers, particularly phosphate and potash. A few experiences of gardeners will serve to show how this work is progressing. An Indianapolis grower complained about the poor set of tomatoes on his first two clusters. At our suggestion he made only one application of manure in early fall. At the last planting of lettuce which preceded the tomato crop he used 125 pounds of 0-10-10 per house 30 by 125 feet. His first three clusters of tomatoes were good, but in the fourth cluster the flowers began to drop. At this time he used one pound of ammonium sulphate per 100 square feet so that his fifth cluster was saved. A company at Logansport has been following this method of fertilization for the past 3 years with very good results. Another grower this year

agreed to follow this plan, but on the second crop of lettuce his old habits were too strong and he applied 3 tons of manure on each space 15 by 125 feet. On his last crop of lettuce he applied 125 pounds of 0-20-20 on each house 30 by 250 feet. His tomatoes started a very vigorous growth, and he was compelled to withhold water to prevent excessive vegetative growth and loss of flowers. As a result, blossom-end rot developed on about 25 to 30 percent of the fruit. In a greenhouse at Evansville very heavy applications of cow manure were applied to the tomato crop with no commercial fertilizer. The tomatoes made an excessive vegetative growth with practically no fruit set. The plants were all removed in May.

This year the buckeye rot of tomatoes has been more common than usual. No explanation has been found for this unusual increase. Successful demonstrations have been conducted in controlling this disease with 2-3-100 soda bordeaux, spraying the lower clusters particularly.

Nematode injury is much less common than formerly. The practice of steam disinfection of the soil is largely responsible for controlling root-knot. Another factor that is helping to reduce the reinfestation of houses with nematodes as well as other pathogens is the care gardeners are now practicing in keeping all rubbish from the manure piles. A few years ago the manure pile was the catch-all for rubbish of all sorts. Continual criticism of this practice with explanations of the dangers and, incidentally, with a few demonstrations of the reinfestation of greenhouse soils have largely overcome this practice.

--C. T. Gregory, extension plant pathologist, Annual Report, 1937. Indiana.

SMUT-RESISTANT VARIETY OF OAT IS BEING PLANTED

A new smut-resistant oat variety--Bannock--suitable for planting in irrigated areas of the Rocky Mountains has been released for commercial planting this year.

All available seed, about 1,200 bushels, has been distributed for commercial planting this year. This should insure a fairly large supply of planting seed for general distribution next year.

From a cross between Markton and Victory varieties, made at the Aberdeen, Idaho, Station in 1923, a selection was made by agronomists of the station and the U. S. Department of Agriculture. This became the new Bannock variety. The Victory variety has been grown in Idaho for 15 years and came from seed imported from Sweden. It has been a good-yielding variety, but susceptible to smut. Markton originated in Oregon and is grown widely in the Northwestern States. It is resistant to most races of smut, yields are high, and it is a good feed oat but has a yellow color, which is not desirable when sold outside the region.

The new variety has inherited the productiveness of both parents. In addition, it has the smut resistance of the Markton and the white-grain color of the Victory. In yield and quality Bannock in general has about equaled or exceeded slightly its parents and other midseason varieties. Yield tests have been made at several experiment stations in the Northwestern States as well as at the Idaho Station. In 8 years of nursery experiments Bannock yielded an average of 134.7 bushels per acre.

The Bannock grows tall and ripens at about the same time as Victory. The straw is stiff, and the kernels have relatively few awns. Its resistance to smut reduces the trouble and expense of seed treatment.

--U. S. Department of Agriculture,
Weekly News Series No. 102-8,
March 17, 1938.

Note: While Bannock was developed primarily for the irrigated sections of southern Idaho and other intermountain States, it should be well adapted to many northern and western oat areas where varieties of midseason white oats are usually grown.

--T. R. Stanton, senior agronomist,
Bureau of Plant Industry,
U. S. Department of Agriculture.

SMUT-RESISTANT WHEATS

Smut control in Oregon is having very good results in most counties. The acreage of the smut-resistant variety Rex in 1937 was 41,000, and it is estimated that this will be more than doubled in 1938. The combined acreage of Rio and Oro was about as large. One thousand one hundred and ninety acres of Oro, 150 acres of Rio, and 2,565 acres of Rex were certified, with practically all of the seed being used in the communities where it was grown.

INCREASED INCOME

It has been estimated that the plant-pathology extension program in North Carolina was at least partially responsible for the adoption of disease-control measures in 1937, which resulted in savings of approximately \$2,000,000 to tobacco farmers, \$2,000,000 to cotton farmers, and \$500,000 to farmers growing other crops - a total saving of approximately \$4,500,000.

GAINS FROM DUSTING PEANUTS IN NORTH CAROLINA

Dusting of peanuts with sulphur and copper fungicides has resulted in substantial increases in yields in experimental tests conducted at various points in the peanut-growing regions of the United States in recent years. The increases in yield apparently were due, in part at least, to control of the Cerospora leaf-spot diseases by the fungicidal dusts. The encouraging results of these tests prompted the planning of dusting demonstrations on peanuts in North Carolina for the season of 1937.

Extension activities on this problem in 1937 were limited to the conducting of result demonstrations.

Twelve demonstrations were conducted in four of the leading peanut-producing counties in the State. They were distributed as follows: 4 in Bertie, 3 in Halifax, 4 in Hertford, and 3 in Northampton.

The fungicide used in all the demonstrations was "Electric" Super-Adhesive Dusting Sulphur, donated by a New York chemical company. This sulphur was 99.8 percent pure, and from 98 to 100 percent 325 mesh or finer.

Varied types of dusting equipment were used in the demonstrations. In all cases the machines were small. None was capable of dusting more than two rows at a time. In most cases the machines used were hand-operated, knapsack types. In a few cases small horse-drawn machines were used.

At each demonstration the dusted plot was in one block and with two exceptions was near the middle of the field. Approximately 1 acre was dusted at each demonstration, and so located as to make it convenient to stack the dusted plants in one- or two-stack rows. An adjacent acre of undusted plants was used as a check.

Three applications of the sulphur dust were made on each demonstration plot with but one exception, where, by mistake, only two applications were made. In all cases the first dust application was made between July 19 and 25, the second between July 29 and August 15, and the third between August 23 and September 1. The plan at each demonstration was to permit 3 weeks to elapse between each dust application. This distribution was closely attained in most cases.

A visit was made to each demonstration during the week of September 14 to 17, and records were made of the prevalence of leaf-spot on the dusted and undusted plots. The records made on this visit were derived as follows. The percentage of leaflets infected by the leaf-spot parasite was established by pulling at random 100 leaflets from the dusted and undusted plots. By counting the infected leaflets in each lot a direct percentage was obtained. The average number of leafspot lesions per leaflet was established from a count of the total number of lesions on 25 leaflets collected at random from each plot. The percentage of defoliation of the plants was estimated from general observations. The average number of mature and immature nuts per plant was established from a count of the nuts on five representative plants pulled at random from each plot. The yield of nuts per acre was calculated from actual

weights of the threshed nuts from the dusted and undusted plots. Records of the yields of hay were made at threshing time.

Leaf-spot was present in all the demonstrational plots, and all the foliage on both the dusted and undusted plots showed leaf-spot lesions. The abundance of infection differed materially. On the average there were 7.6 leaf-spot lesions per leaflet on the dusted plants and 24.2 lesions per leaflet on the undusted plants. This difference apparently was sufficiently great to account for the heavy defoliation on the undusted plants and the high retention of foliage in the dusted plants. However, it will be noted that a high degree of leaf-spot control was not obtained in all the demonstrations. For example, leaf-spot was essentially as severe on the dusted plot as on the undusted on a farm in Northampton County. In this case it seemed evident that the dust applications were not properly timed in relation to the epidemic of the disease to obtain the best control, and the fact demonstrated that in future work careful attention will have to be given to timing of the dust applications. From the observations made it appeared probable that dusting was started from 10 days to 2 weeks too early in all the demonstrations. This is concluded from the fact that leaf-spot did not begin to show up in the fields until August 15 to 20. It is probable that the first dust application would have been more effective had it been applied between August 1 to 10.

The yield of peanuts from dusted and undusted plots was measured in two ways. On the visits made between September 14 to 17, five plants from each treated and untreated plot were pulled, and the number of mature and immature nuts counted. These counts showed an average of 50 mature and 24 immature nuts per plant on the dusted plots and 37 mature and 16 immature nuts per plant on the undusted plots. Actual weight records of the yield of nuts made at threshing time showed a yield of 2,322 pounds per acre from the dusted plots and 1,979 pounds per acre from the undusted plots. Hence, an average increase in yield of 343 pounds of nuts per acre resulted from the sulphur applications in the 12 demonstrations where yield records were kept. The value of these nuts at 3 cents per pound was \$10.29. The cost of three applications of dust on 1 acre was estimated to be \$3. Hence, the profit per acre from dusting in the 12 demonstrations was approximately \$7.29.

A record of the yield of hay was kept in but one demonstration which was in Bertie County. In this case the yield of hay was 1,002 pounds per acre from the dusted plot and 817 pounds per acre from the undusted plot. Observations indicated that increased yields of hay were general as a result of the applications of sulphur dust.

So far as is known by the writer, only the 14 acres involved in the result demonstrations described above were dusted with sulphur in North Carolina in 1937. However, it is anticipated that if further work demonstrates economically increased yields of peanuts from application of sulphur dust, peanut farmers in the State will quickly adopt the practice.

--Luther Shaw, extension plant pathologist, Annual Report 1937. North Carolina.

SULPHUR DUST INCREASES PEANUT YIELDS IN GEORGIA

In 1937, 11 Georgia farmers cooperated in peanut-dusting demonstrations and experiments for insect and disease control. The material used was a 325-mesh sulphur applied at the rate of 16 pounds per acre per application in all except two instances where 10 pounds per acre were used. Three applications were made mostly at 2-week intervals. The average results from the 11 demonstrations are as follows:

Pounds of nuts per acre: Dusted, 1,511; undusted, 1,278.
Gain in yield of nuts: 233 pounds, or 18 percent.

On two demonstration plots the yield of peanut hay was recorded as follows:

Pounds per acre: Dusted, 3,817; undusted, 2,759.
Increase in yield of hay: 1,058 pounds, or 38 percent.

--H. W. Rankin, extension plant pathologist, Pennsylvania. (Formerly with Georgia Extension Service.)

TOMATO-SEED CERTIFICATION

The following varieties and acreages of tomatoes were inspected and passed in New York last year according to Charles Chupp, extension plant pathologist in that State:

<u>Variety</u>	<u>Acres</u>
Marglobe.....	3.00
Early Stone.....	2.75
Nystate.....	2.50
Earliana.....	2.25
Scarlet Topper (Pritchard).....	2.50
John Baer.....	6.00
Italian Red Pear.....	0.75
Comet.....	0.25

CUCUMBER MOSAIC

In upstate New York, it has been shown that in nearly all cases of cucumber mosaic the only plants concerned with the spread of the virus are catnip and the bur cucumber. These two are easily eradicated, and where this has been done satisfactorily the disease has been eliminated. At field meetings and tours, this weed relationship has been shown to growers and has proved an impressive object lesson.

PERCENTAGE OF SCAB OCCURRING ON APPLES
WHEN DIFFERENT SPRAYS ARE OMITTED
PENNSYLVANIA

<u>Spray omitted</u>	<u>1934</u>	<u>1935</u>	<u>1936</u>	<u>1937</u>
Delayed dormant.....	6.2	23.7	9.8	10.8
Pre-pink.....	4.2	8.4	.8	14.4
Pink.....	5.5	16.7	2.7	22.4
Petal-fall.....	3.1	7.7	1.9	15.8
First cover.....	2.3	2.8	3.0	10.5
Second cover.....	3.3	7.6	1.3	3.5
Last cover.....	5.1	7.9	1.3	4.6
Complete.....	.9	1.7	.5	1.5

R. S. Kirby, extension plant pathologist, Pennsylvania.

PEA SEED, GRAPHITE, AND RED OXIDE

Some 90,000 bushels of cannery peas were treated with red oxide of copper in New York last year. Graphite was put in the seed drill to prevent cracking--the seed go through easier. This year J. G. Horsfall, plant disease specialist at Geneva, estimates 110,000 canner bushels and a considerable quantity of market peas will be so treated.

--Market Growers' Journal 62:299.
May 15, 1938.